

REMARKS

By this reply, claim 18 is amended, and new claims 42-47 are added, leaving claims 18-27, 29-31 and 42-47 are pending in the application. No new matter is added by the amendments. Favorable consideration and allowance of the pending claims are respectfully requested in light of the following remarks.

Personal Interview

Applicants thank Examiner Mai for conducting a personal interview with their undersigned representative on September 26, 2006. Applicants' separate record of the substance of the interview is incorporated in the following remarks.

Rejection Under 35 U.S.C. § 103

Claims 18-27 and 29-31 were rejected under 35 U.S.C. § 103(a) over U.S. Patent Application Publication No. 2003/0077448 to Ueta et al. ("Ueta") in view of U.S. Patent No. 6,558,565 to Matsutani et al. ("Matsutani"). The rejection is respectfully traversed.

Claim 18 recites a powder composition for the preparation of compacted and sintered structural parts, the powder composition comprising an iron or iron based powder, wherein less than about 5% of the powder particles have a size below 45 μm ; graphite, wherein the graphite is in an amount up to 1% by weight; and a lubricating amount of an alkylalkoxy or polyetheralkoxy silane, wherein the alkyl group of the alkylalkoxy silane and the polyether chain of the polyetheralkoxy silane include between 8 and 30 carbon atoms, and the alkoxy group includes 1-3 carbon atoms (emphasis added).

As was discussed during the interview, claim 18 is amended to more clearly recite that graphite is present in the powder composition, wherein the amount of graphite in the powder composition is up to 1% by weight.

Applicants submit that Ueta does not suggest the powder composition recited in claims 18-27, 29 and 30. It is Applicants' understanding that Matsutani is applied in the ground of rejection only with respect to claim 31.

Ueta discloses a ferromagnetic-metal-based powder for the production of magnetic parts, but not for the production of structural parts. Ueta's powder includes a powder core and an insulating coating. The powder can include a lower layer (inner coating) containing at least one of Si, Ti, Zr, P and Cr compounds, and an outer coating containing silicon resin and pigment and forming an outer surface. See the Ueta Abstract. Ueta discloses process steps for forming the lower layer at paragraphs [0074] to [0078]. Ueta discloses that the lower layer coating is included in the powder to improve the insulation property of the iron-based powder after annealing as compared to other embodiments of the powder that include only the coating containing the silicone resin and pigment, i.e., embodiments that do not also include the lower layer. See paragraph [0075] of Ueta.

According to Ueta, the lower layer can contain silane compounds as materials that contain silicon compounds. See paragraphs [0080] and [0081] of Ueta. The powder including the lower layer is disclosed in Ueta as only being used as a starting material ("raw material") for the subsequent overlying coating with at least silicone resin and pigment.

Applicants submit that one skilled in the art would understand that a silane is a silicon compound, but it is not a silicone resin. A silicone resin is a type of silicone

material formed by branched, and cage-like oligosiloxanes with the general formula of $R_nSiX_mO_y$, where R is a non-reactive substituent, usually Me or Ph, and X is a functional group H, OH, Cl or OR. These groups are further condensed in many applications, to give highly crosslinked, insoluble polysiloxane networks. The alkylalkoxy silanes and the polyetheralkoxy silanes are monomers. Ueta discloses that the silane compounds are present only in the lower layer, and that the silicone resin is provided in the outer coating of the powder.

Accordingly, when Ueta's powder also comprises the lower layer, the outer coating is provided over the lower layer and the outer coating (and not the lower layer) forms the outer surface of the powder particles. Ueta provides no motivation to modify the powder to include a lubricating amount of the silane compound in the lower layer because the lower layer is covered. Thus, the silane compounds are not used for lubricating purposes in Ueta's powders. In stark contrast, the silanes in Ueta's lower layer are for improving the insulation properties of the powder particles.

Ueta discloses the addition of a lubricant for pressing the iron-based powder. See paragraph [0105] of Ueta. In paragraph [0108], Ueta discloses examples of conventional lubricants. Ueta discloses that "[a]ddition of the lubricant can be omitted depending on the use of the powder core" (emphasis added). Ueta's lubricant is not a silane, and it is an optional component of the powder. Accordingly, Applicants submit that Ueta provides no suggestion to use a "lubricating amount" of a silane, much less of a silane recited in claim 18.

Furthermore, Ueta discloses that any one of the silane compounds described in paragraph [0081] can be used without any problem in Ueta's powder. See paragraph [0082] of Ueta. As discussed above, Ueta's lower layer is provided to

enhance the insulating properties of the powder. However, the present inventors determined that the silanes recited in claim 18 provide desirable results, while other silanes do not provide such desirable results. Example 4 described at page 8 of the specification demonstrates that powders including the silanes methyl-tri-methoxy silane and methyl tri-propoxy silane, which are not included in the silanes recited in claim 18, do not provide satisfactorily compaction properties. In contrast, according to the examples of Ueta, methyl-tri-methoxy silane provides satisfactory results in Ueta's powder. The Ueta raw material powders M, N and Y include methyl-tri-methoxy silane. See Tables 4-1, 4-2 and 6 of Ueta. Ueta provides no example that used a silane recited in claim 18.

Applicants also submit that Ueta also does not suggest a powder having a particle size as recited in claim 18 and which comprises a silane, much less a silane compound as recited in claim 18, still much less a "lubricating amount" of the recited silane.

Embodiments of the claimed powder composition can be used to make high performance structural parts. Ueta's powders, in contrast, are designed for making a powder core used as a choke coil, noise filters, and the like in power circuits, etc., and for an iron-based powder used as a material for the powder core. Ueta's powders are used where their magnetic properties are needed.

For at least the foregoing reasons, Ueta does not suggest the powder composition recited in claim 18. Thus, claim 18 and claims 19-27, 29 and 30, which depend from claim 18, are patentable over Ueta.

Claim 31 is directed to a method of preparing a high density green compact. Claim 31 depends from claim 18. Applicants submit that Matsutani fails to cure the

deficiencies of Ueta with respect to the powder composition recited in claim 18. Thus, claim 31 is also patentable. Therefore, withdrawal of the rejection of claims 18-27 and 29-31 is respectfully requested.

New Claims

New claims 42-47 are also patentable.

New claim 42 depends from claim 31. Support for claim 42 can be found at page 10, last paragraph, of the specification.

Independent claim 43 recites a powder composition consisting essentially of an iron or iron based powder, wherein less than about 5% of the powder particles have a size below 45 µm; graphite, wherein the graphite is in an amount up to 1% by weight; and a lubricating amount of an alkylalkoxy or polyetheralkoxy silane, wherein the alkyl group of the alkylalkoxy silane and the polyether chain of the polyetheralkoxy silane include between 8 and 30 carbon atoms, and the alkoxy group includes 1-3 carbon atoms; optionally a conventional lubricant; and optionally at least one of (i) an alloying element selected from the group consisting of Mn, Cu, Ni, Cr, Mo, V, Co, W, Nb, Ti, Al, P, S and B, (ii) a machinability enhancing compound, (iii) a hard phase material, and (iv) a flow agent (emphasis added). Support for the recited optional elements of claim 43 is found in the paragraph bridging pages 4 and 5, and at page 5, third paragraph, of the specification. The Ueta powder, for example, does not consist essentially of the components recited in claim 43.

Claims 44-46 depend from claim 43.

Independent claim 47 recites the features of claim 18 and that "the powder composition is formed by a process comprising mixing the iron or iron based powder with the silane to produce a mixture, and mixing the mixture only with graphite to produce the powder composition" (emphasis added). Support for claim 47 is provided, for example, in Examples 1 and 2 of the present specification. Ueta, for example, does not disclose or suggest the claimed powder composition formed by the recited steps.

Graphite is effective to improve the properties of compacts made from the powder composition recited in claim 47. In the Ueta powder, for example, graphite can be added as a sedimentation inhibitor, which forms part of the outer layer of Ueta's powder particles along with the silicon resin and pigment. See paragraph [0061] of Ueta.

Conclusion

Should the Examiner have any questions regarding this application, the undersigned respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

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